

Industry Insights: The Use of Private Cellular Networks in Oil and Gas

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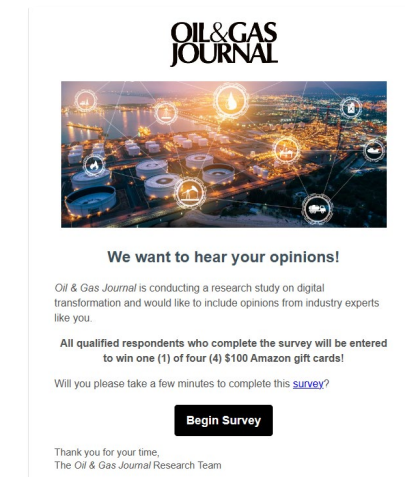
Objectives and Methodology

OVERVIEW

- Methodology, data collection, and analysis by Endeavor Business Intelligence on behalf of Ericsson. Data collected December 11 through December 21, 2023.
- Methodology conforms to accepted marketing research methods, practices and procedures.

METHODOLOGY

- On December 11, 2023, Endeavor Business Intelligence emailed invitations to participate in an online survey to members of our *Oil & Gas Journal* database. Reminder mailings were sent to non-respondents between December 15 and December 20, 2023.
- By December 21, 2023, Endeavor Business Intelligence had received 125 qualified responses to the survey.



RESPONSIVE MOTIVATION

- To encourage prompt response and increase the response rate overall, a live link to the survey was included in the email invitation to route respondents directly to the online survey.
- The invitations and survey were branded with the *Oil & Gas Journal* logo to take advantage of user affinity for this valuable brand.
- Each respondent was afforded the opportunity to enter a drawing for one of four \$100 Amazon.com gift cards.

Study: Private cellular networks deliver superior communication performance, but adoption in the oil and gas industry is still a work in progress

The choices oil and gas companies make about communications networks today will either hinder or accelerate their digital transformation. However, many organizations may not understand the options available to them or feel uncertain about how implementing an advanced private cellular network (PCN) can contribute to achieving their goals.

According to a survey by the Oil & Gas Journal, companies recognize the criticality of safe and reliable communications but lack the understanding to properly evaluate the advantages and shortcomings of diverse network types.

Companies within the sector are embracing digitization and automation to safeguard and boost revenue, enhance agility, foster innovation, and improve project delivery. While they recognize the importance of a robust communications network in achieving these goals, there is a lack of understanding about how a 4G/5G PCN can facilitate the attainment of their objectives.

A significant factor contributing to this situation is the disparity between the digital transformation leaders and laggards. While approximately one-third of respondents view their digitization program as comparable to their peers, only 5% consider themselves ahead of the curve, and 30% are just getting started. The difference is evident in both survey responses and their understanding of communication network technologies.

Fully 90% of respondents use Wi-Fi for their IT data network, while 57% use wired Ethernet, and 6% use LoRA. Most respondents also rely on Wi-Fi for their OT networks, but nearly half continue to use wired Ethernet.

Study: Private cellular networks deliver superior communication performance, but adoption in the oil and gas industry is still a work in progress

Although the data show that PCNs offer significant advantages over traditional systems, the survey indicates the broader oil and gas sector is not yet reaping the benefits, with 48% either uninformed about the technology or simply not planning to put it to work. Only 11% of respondents are integrating private networks.

Perceived value is one impediment to adoption. More than half of the respondents consider the cost of deployment a barrier, even though 64% said employees would benefit from a PCN, and 48% believe a PCN would provide better security.

Uncertainty also exists when determining how to manage installation, with confusion about whether a communications provider, network equipment supplier, or cloud service provider would be the best partner. Just over half of the respondents think cybersecurity experience is the greatest value a partner brings to the table, while 44% believe service level management and performance guarantees are most important, and 41% think technical architecture and network design skills are most critical.

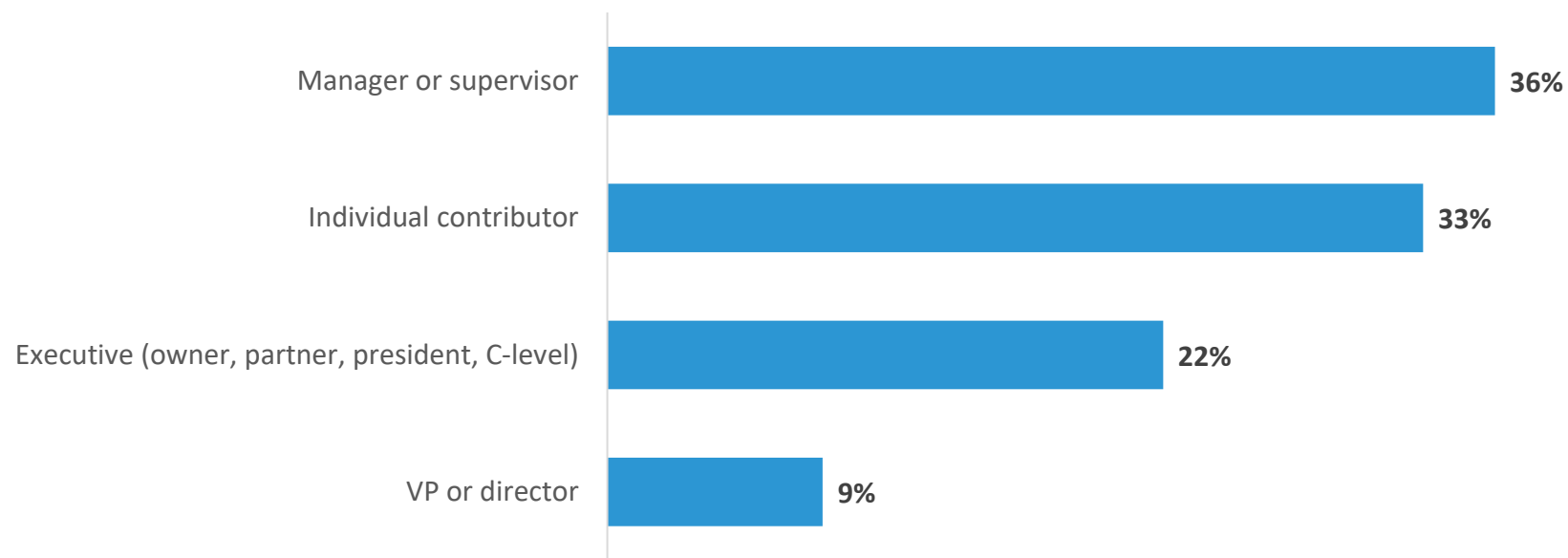
This survey demonstrates that oil and gas companies are committed to digitization and want the best tools to achieve it. While the sector is currently facing numerous challenges in deciding and determining its planned next steps, specifically around communication delivery, the opportunity remains to transform operations through digitalization, ultimately enhancing productivity, increasing efficiencies, and creating a more secure environment.

Respondent Profile

Job Level

Two-thirds of respondents (67%) were at a manager level or higher, with one-third (36%) identifying as a manager or supervisor.

Which of the following best describes your job level?

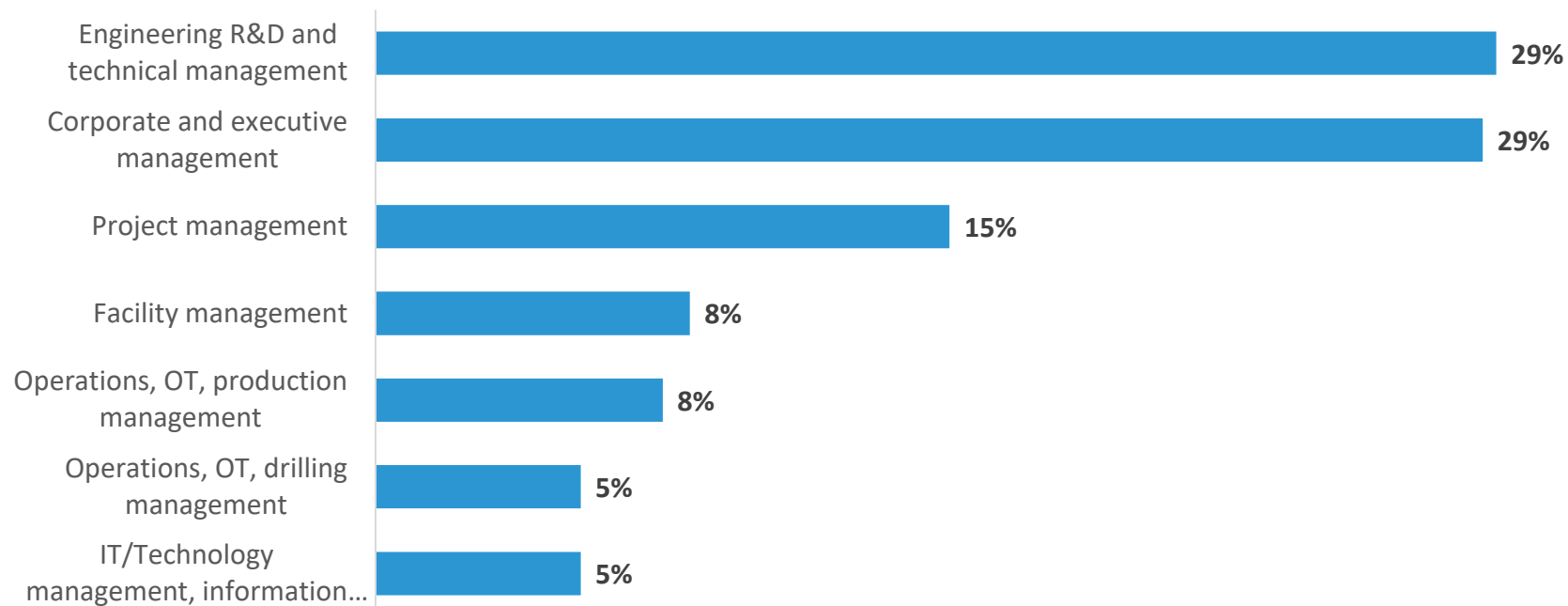


Base: All respondents (n=276).

Job Role

Three in ten respondents identified their role as engineering R&D and technical management (29%) or corporate and executive management (29%).

Which of the following best describes your role?

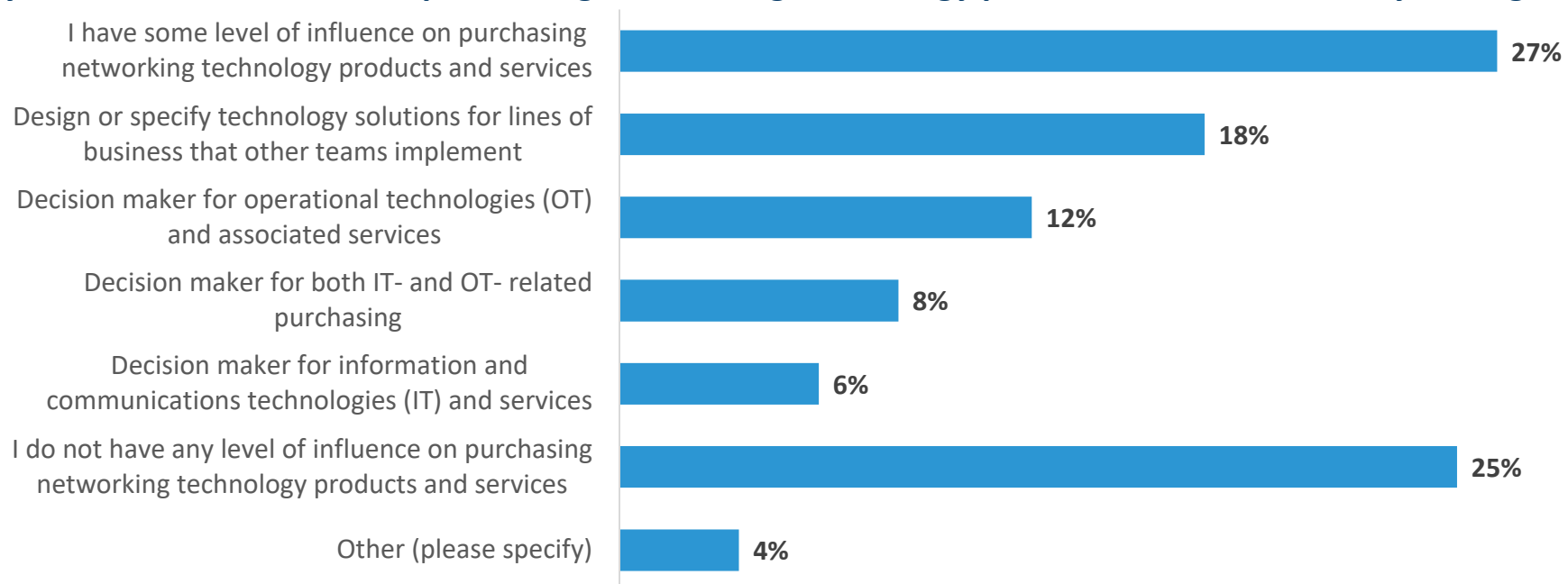


Base: All respondents (n=279)

Purchasing Influence

A quarter of respondents (25%) did not have any level of purchasing influence, while 27% had some level of influence.

What is your level of influence for purchasing networking technology products and services for your organization?

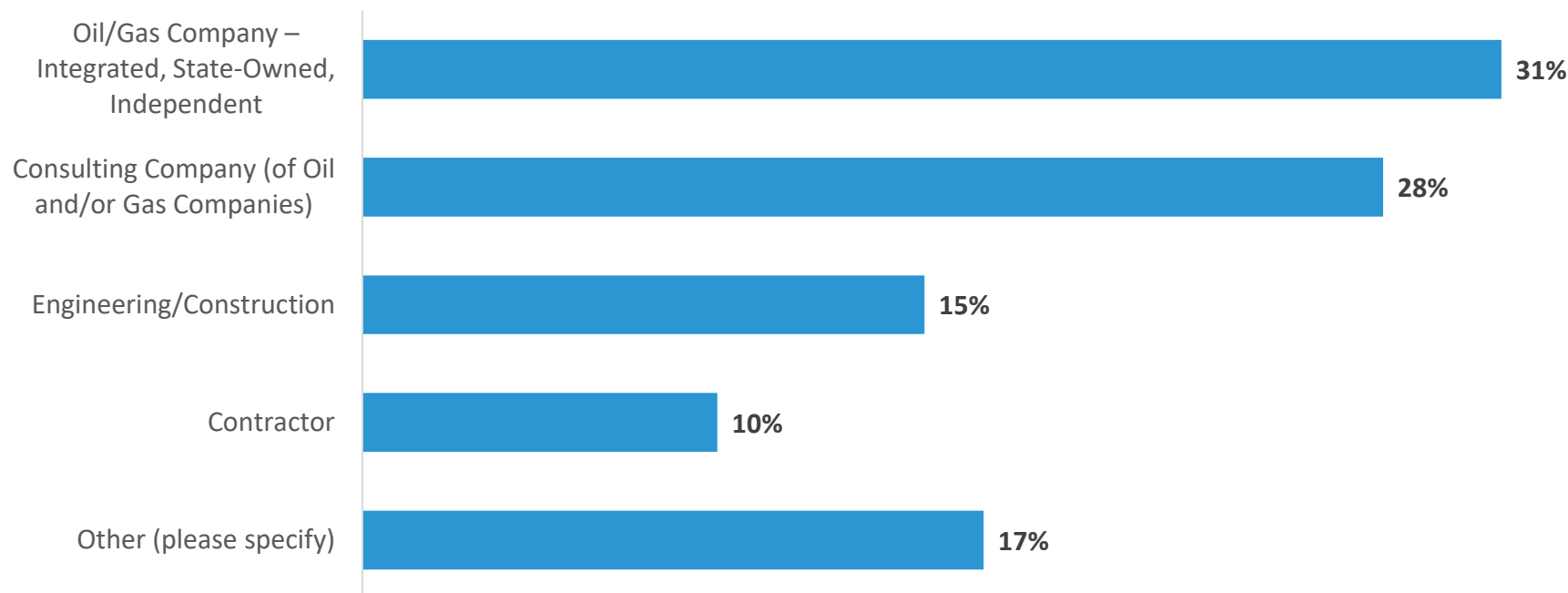


Base: All respondents (n=249).

Business Type

Three out of ten respondents (31%) belonged to an oil/gas company that was integrated, state-owned or independent. More than a quarter (28%) belonged to a consulting company.

What type of business do you belong to?

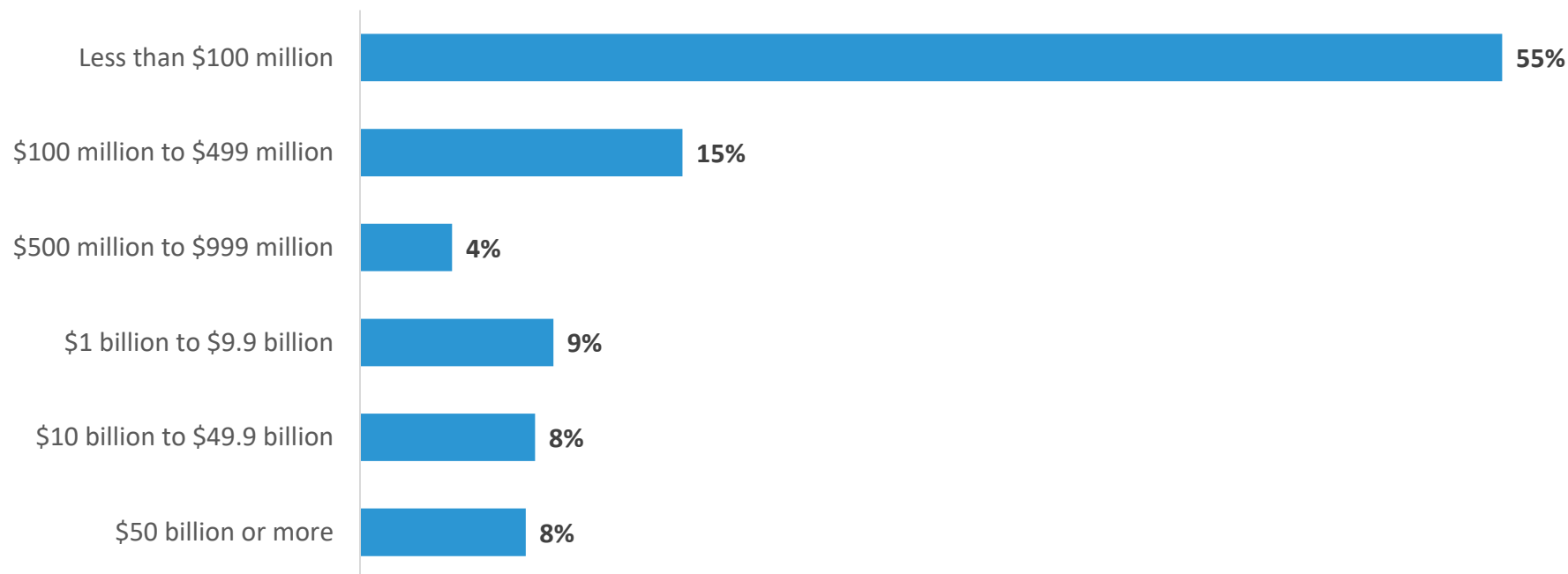


Base: All respondents (n=250).

Annual Revenue

More than half of respondents (55%) said that their company's annual revenue was less than \$100 million. A quarter (25%) said that their company's annual revenue was more than a \$1 billion.

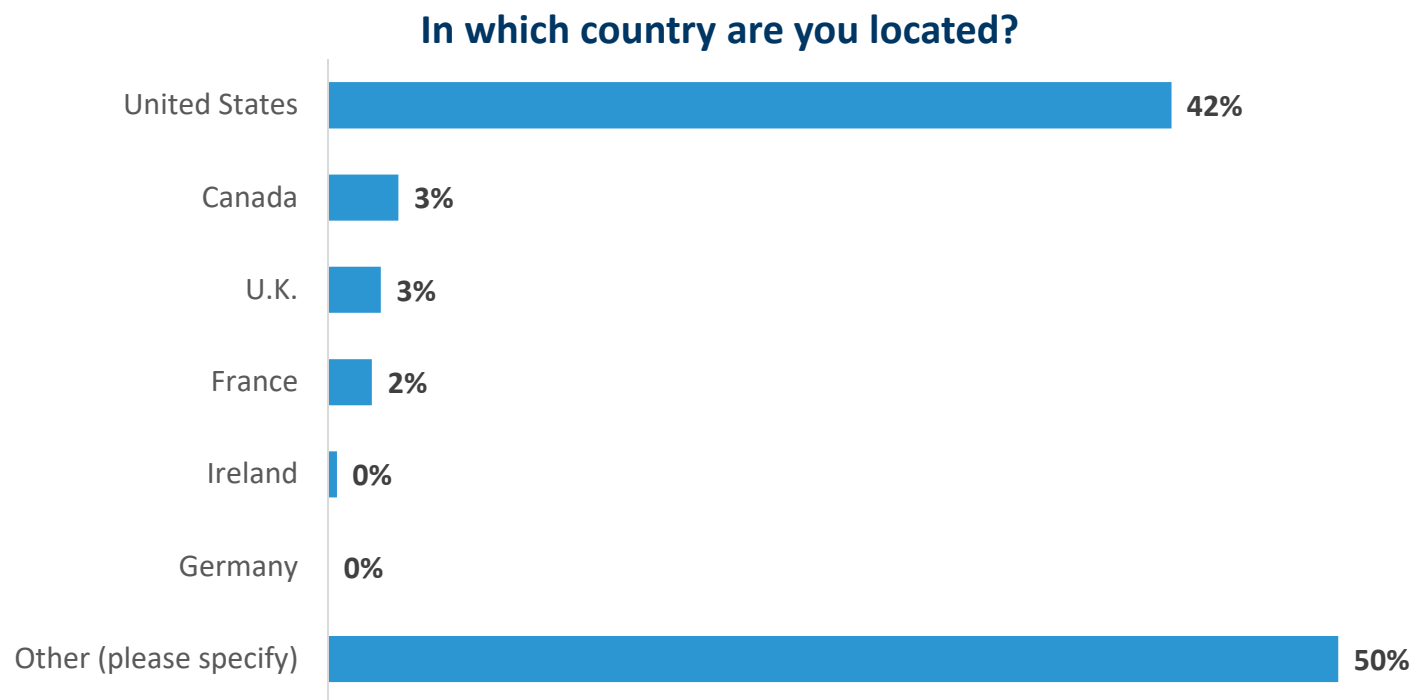
Into which of the following ranges does your company's annual revenue fall?



Base: All respondents (n=227).

Location

Two in five respondents (42%) were based in the United States while half (50%) were outside of the countries listed. 8% of respondents said they were from India.

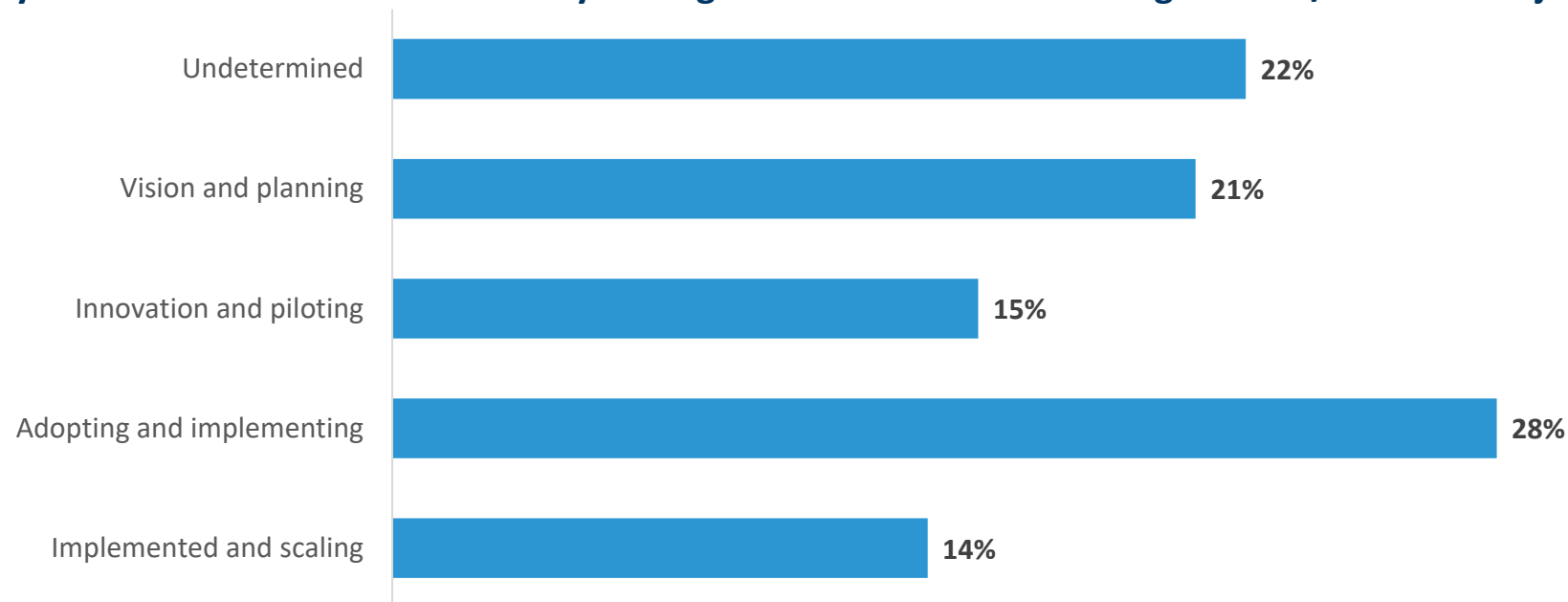


Base: All respondents (n=231).

Digitization/Automation Journey

Nearly three in ten respondents' (28%) organizations were at the adopting and implementing stage of their digitization/automation journeys. Almost a quarter (22%) were undetermined on where their organization was on the journey.

How would you describe the current state of your organization in terms of its digitization/automation journey?



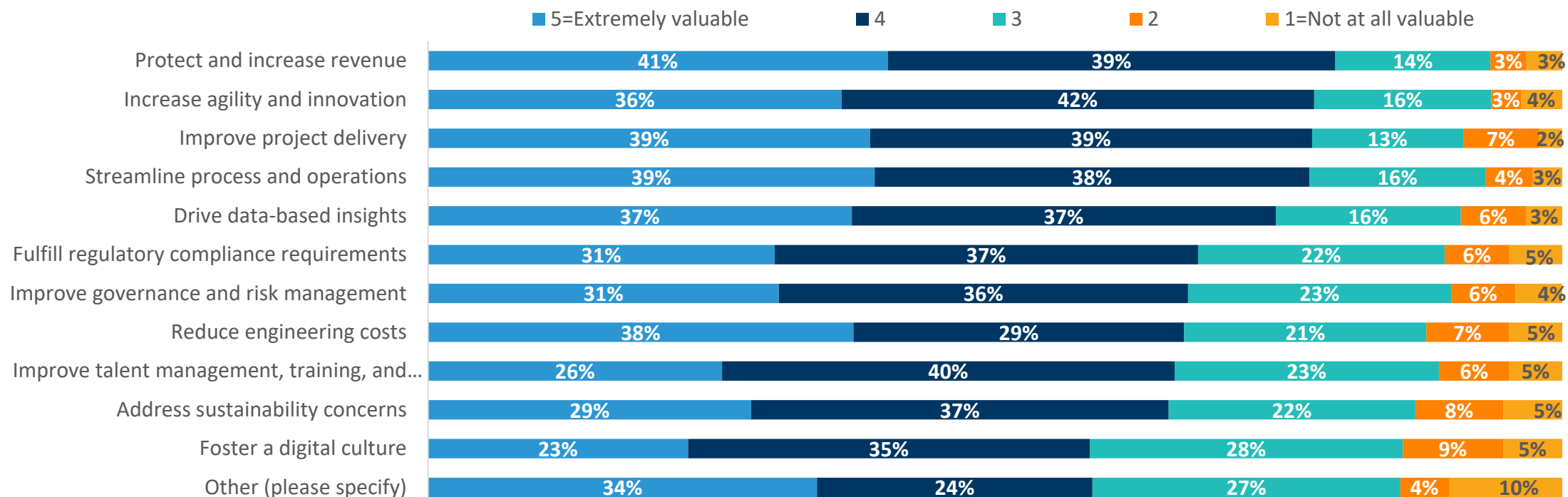
Base: All respondents (n=232).

Digital Transformation

Value of Digital Transformation Promises

Four out of five respondents (80%) found the promise of “protect and increase revenue” most valuable (5=Extremely valuable + 4) followed by “increase agility and innovation” (78%) and “improve project delivery” (78%).

What are the promises of digital transformation that you value most? (Please rate the value on a scale of 1 to 5 with 1 being Not at all valuable to 5 being Extremely valuable.)

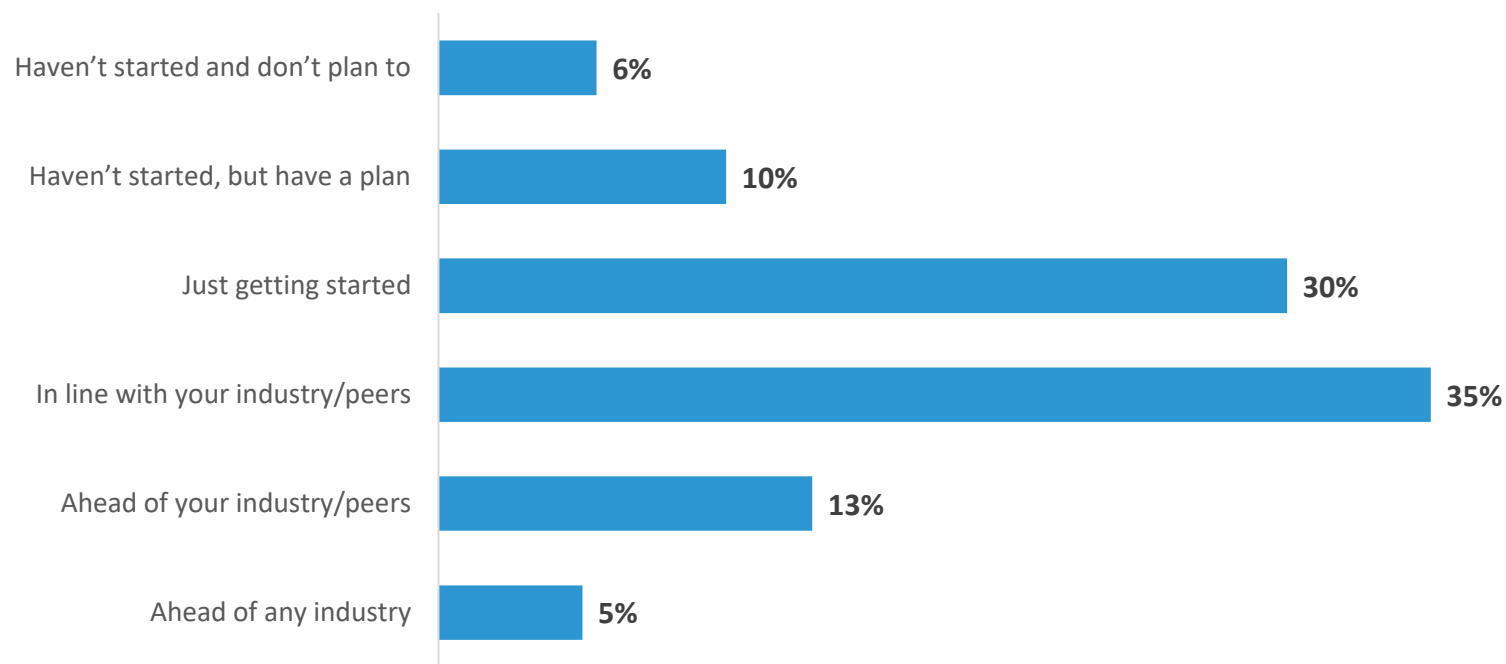


Base: All respondents (n=197).

State of Digital Transformation

More than a third of respondents (35%) felt that their current state of digital transformation was in line with their industry/peers while three in ten (30%) said they were just getting started. 5% felt that they were ahead of any industry.

How would you describe the current state of your digital transformation?

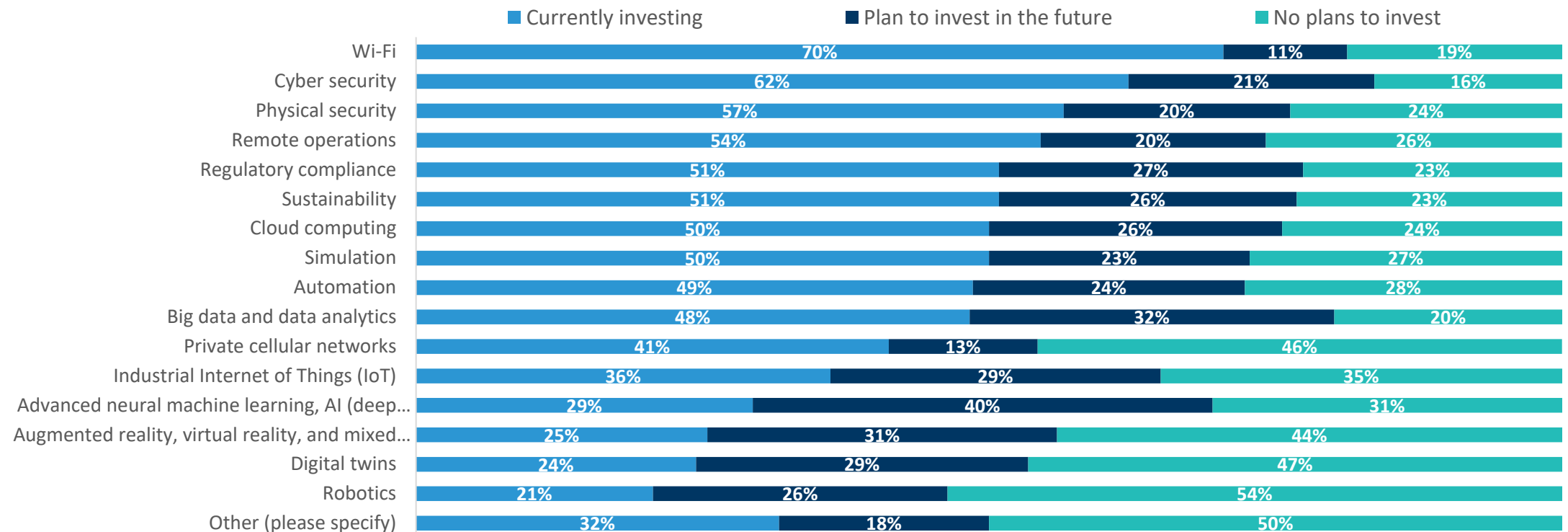


Base: All respondents (n=195).

Technology Investments

Seven in ten respondents (70%) were currently investing in Wi-Fi followed by cybersecurity (62%) and physical security (57%). Two in five said they were planning to invest in advanced neural machine learning/AI. More than half (54%) said that they were not planning to invest in robotics.

To what degree are you investing in the following technologies:

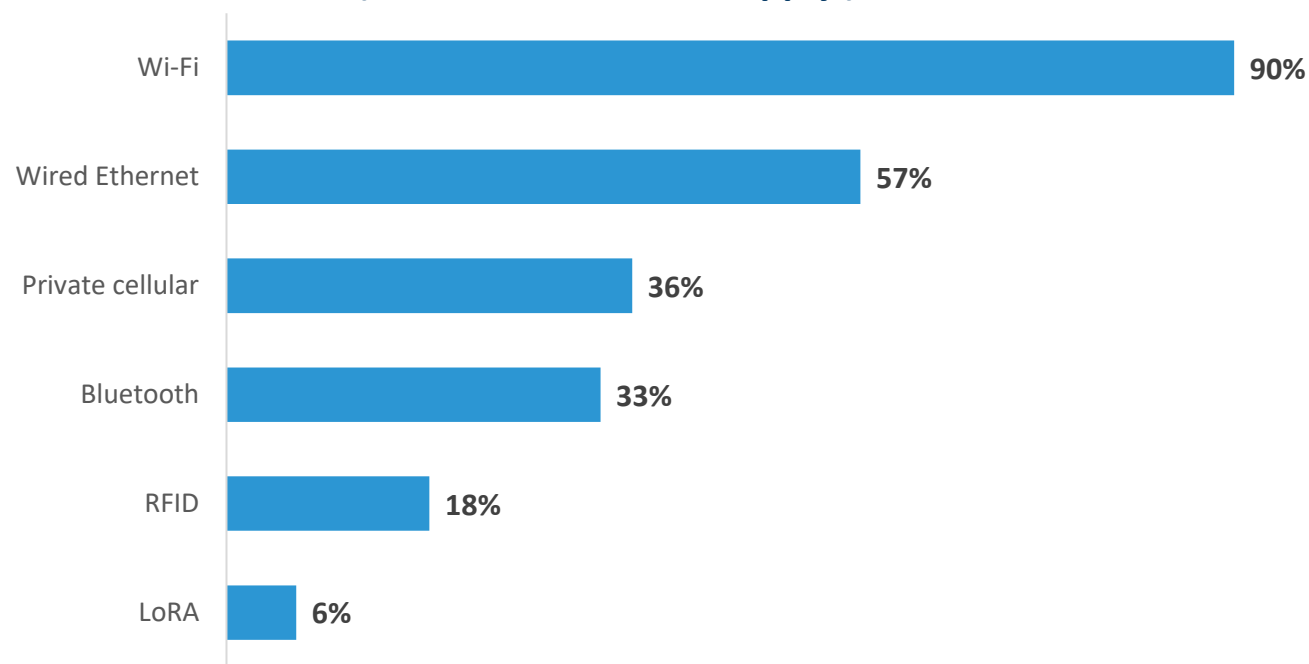


Base: All respondents (n=182).

IT Data Network Technology

Nine in ten respondents (90%) were currently using Wi-Fi in their IT data networks while more than half (57%) were using wired ethernet. LoRA was the least used technology with just 6% of respondents currently using it.

Which of the following technologies are currently being used for your IT data network?
(Please select all that apply.)

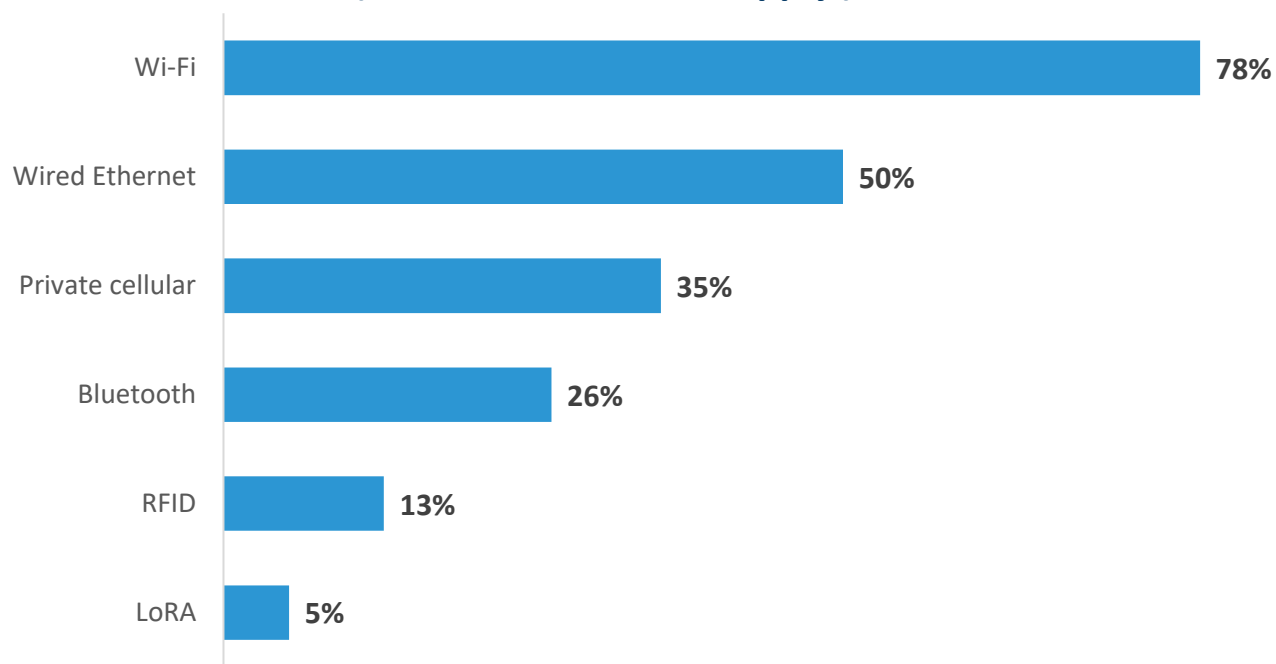


Base: All respondents (n=177).

OT Data Network Technology

Four out of five respondents (78%) were using Wi-Fi in their OT data networks, while half (50%) were using wired ethernet. LoRA was the least used OT technology with 5% currently using it.

Which of the following technologies are currently being used for your OT data network?
(Please select all that apply.)

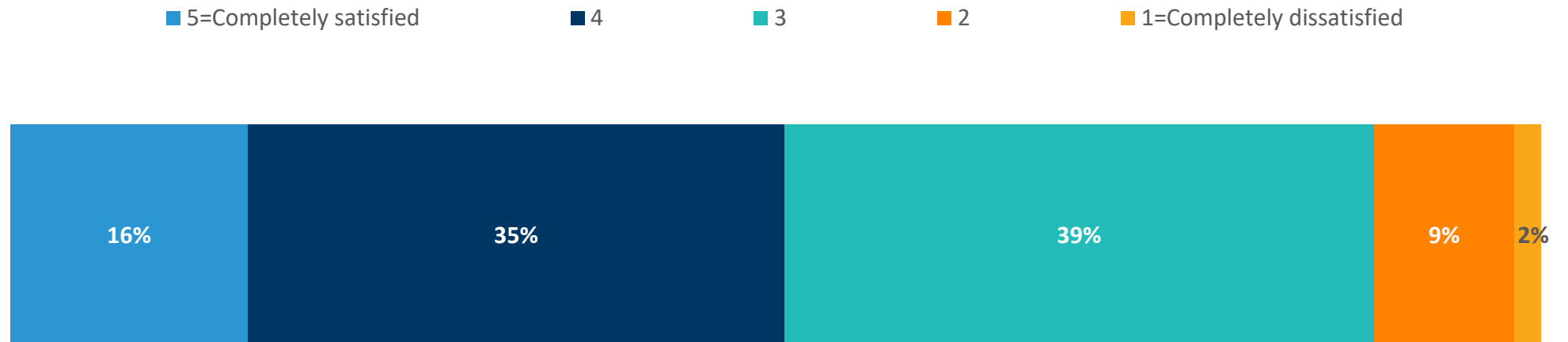


Base: All respondents (n=171).

Data Network Satisfaction

More than half of respondents (51%) said they were satisfied (5=completely satisfied + 4) with their current data network. 39% were neither satisfied/nor dissatisfied while only 2% were completely dissatisfied.

To what degree are you satisfied with your current data network?

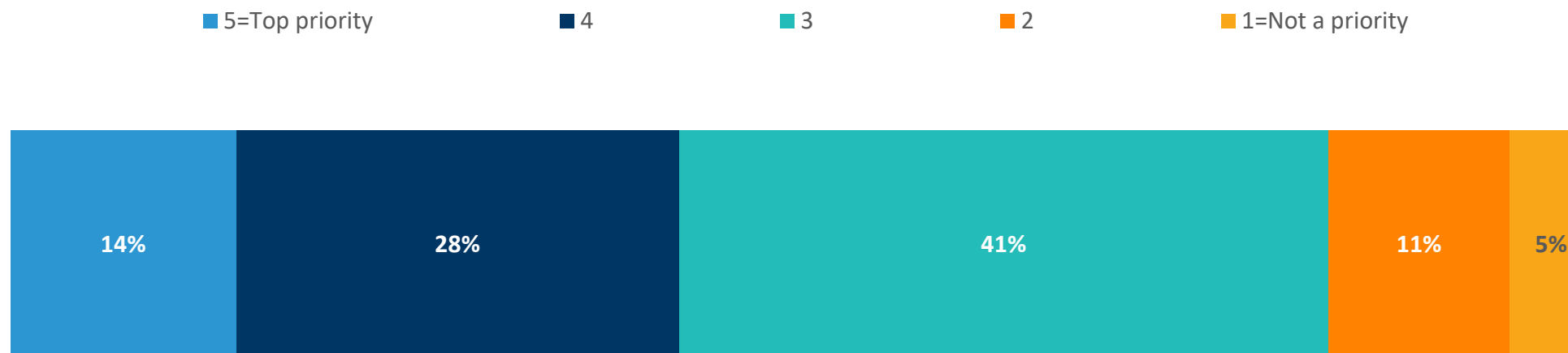


Base: All respondents (n=174).

Data Network Priorities

Two in five respondents (42%) said that data network investments were a priority (5=top priority + 4) compared to other technology investments while another two in five (41%) said it was neither a top priority nor not a priority.

How do investments in your data network (OT/IT) rank in comparison to other technology priorities?

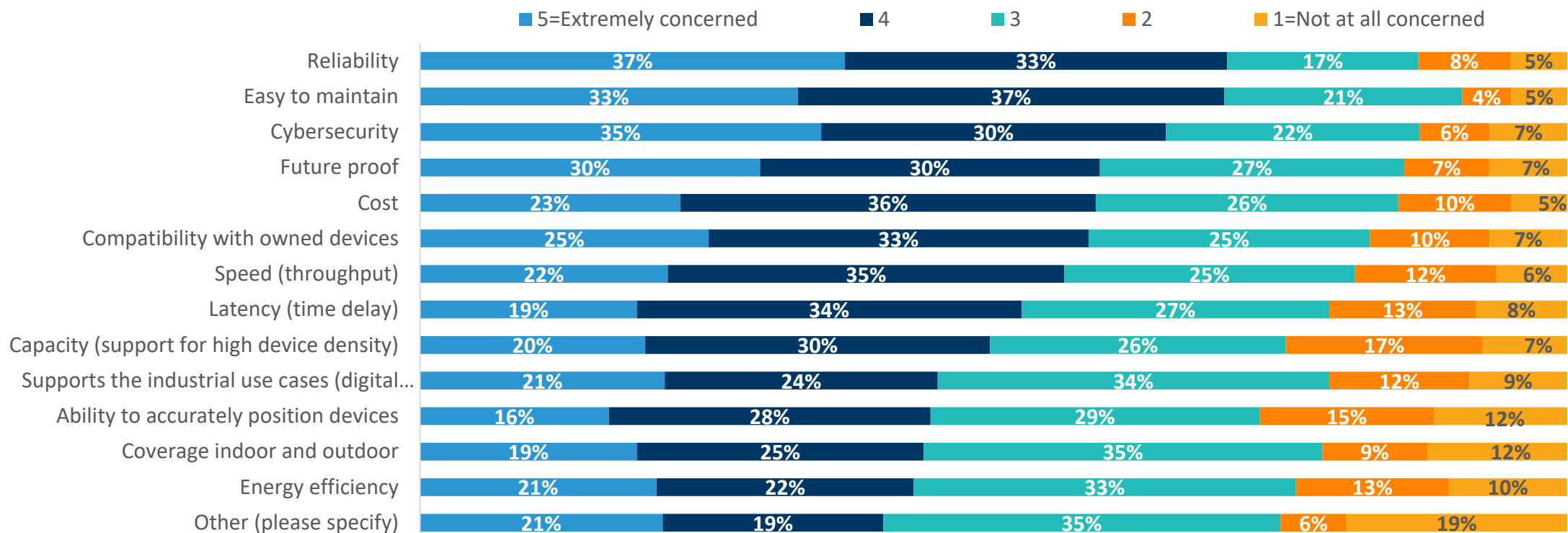


Base: All respondents (n=174).

Data Network Concerns

Seven out of ten respondents (70%) said that they were concerned (5=extremely concerned + 4) about the reliability and maintenance of their current data network. The two aspects that were not a concern (1=not at all concerned + 2) were the ability to accurately position devices (27%) and capacity (24%).

How concerned are you about the following aspects of your current data network?

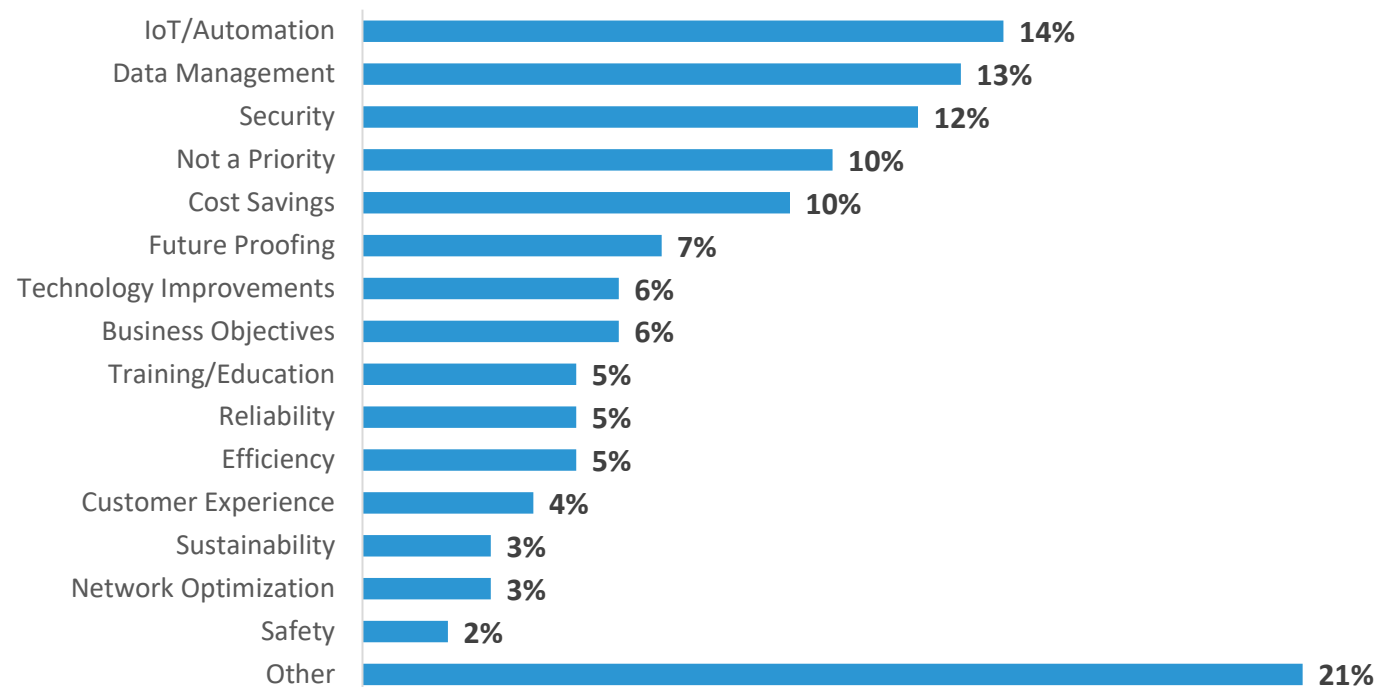


Base: All respondents (n=166).

Priorities for Digital Transformation

When listing out their top priorities for digital transformation, 14% of respondents mentioned incorporating IoT and automation into their data networks followed by mechanisms to better manage their existing data (13%).

What are your priorities for digital transformation?



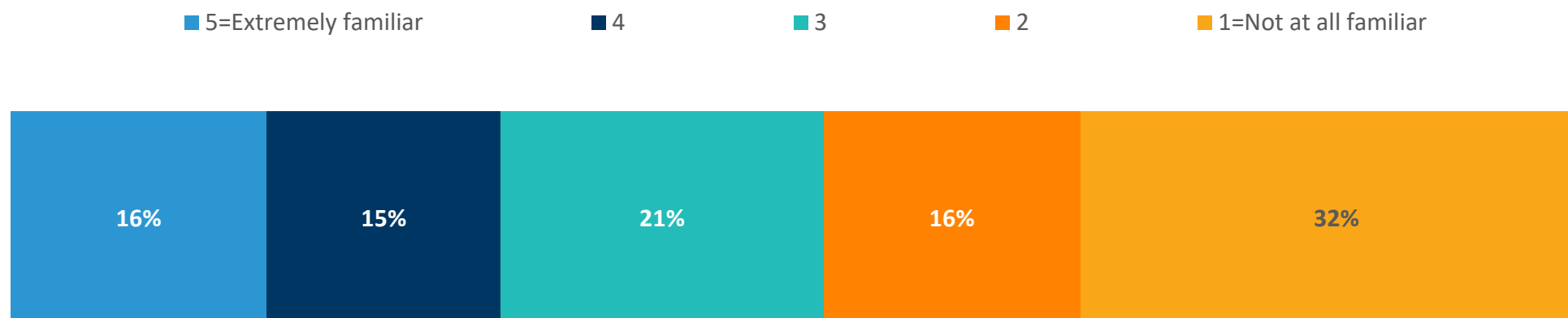
Base: All respondents (n=105); open-ended.

Private 5G Networks

Familiarity with Private Cellular 5G Networks

Nearly half of the respondents (48%) were not familiar (1=not at all familiar + 2) with the use of private cellular 5G networks in oil and gas. While just three in ten respondents (31%) were familiar (5=extremely familiar + 4) with its use.

How familiar are you with the use of private cellular 5G networks in oil and gas?
 (Please rate your familiarity on a scale of 1 to 5 with 1 being Not at all familiar to 5 being Extremely familiar.)

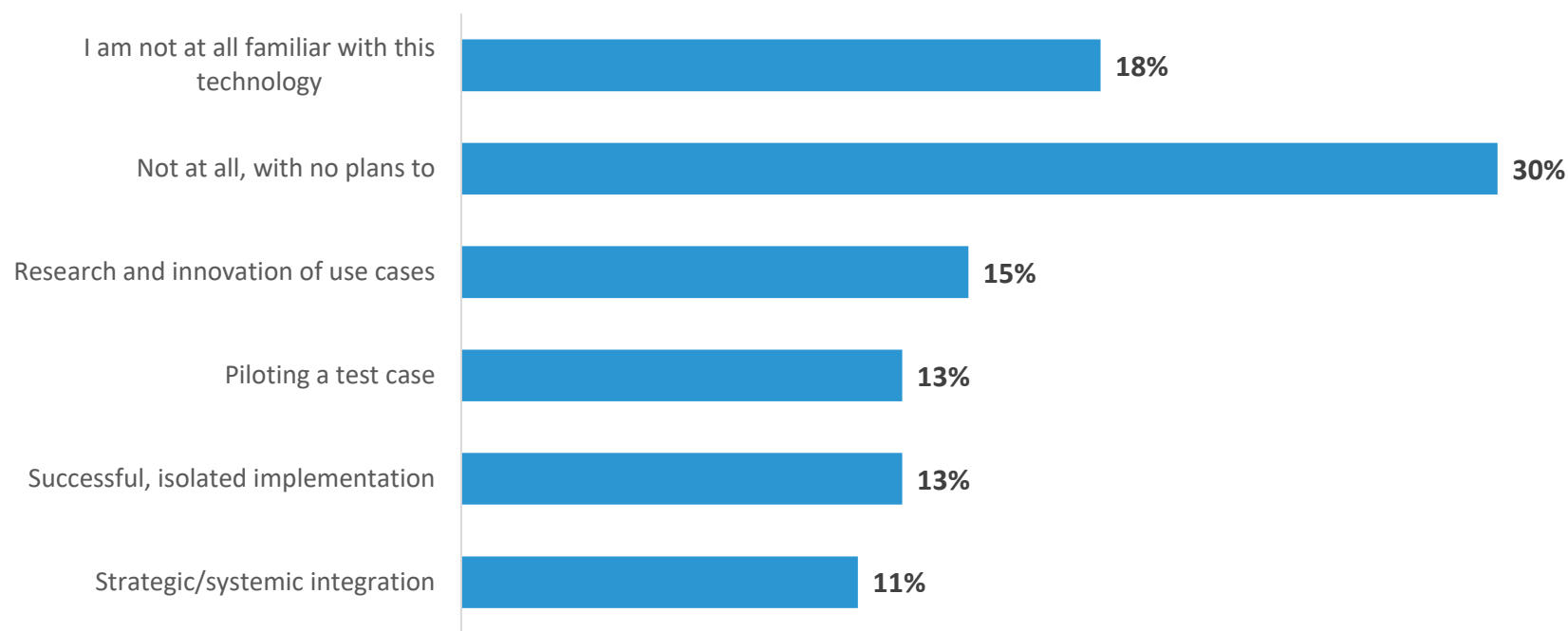


Base: All respondents (n=141).

Usage of Private Cellular Networks

Three in ten respondents (30%) had no plans to leverage private cellular networks within their organization while 18% were not at all familiar with the technology. 37% of respondents were using or piloting a private cellular network.

To what degree are you leveraging private cellular networks within your organization?

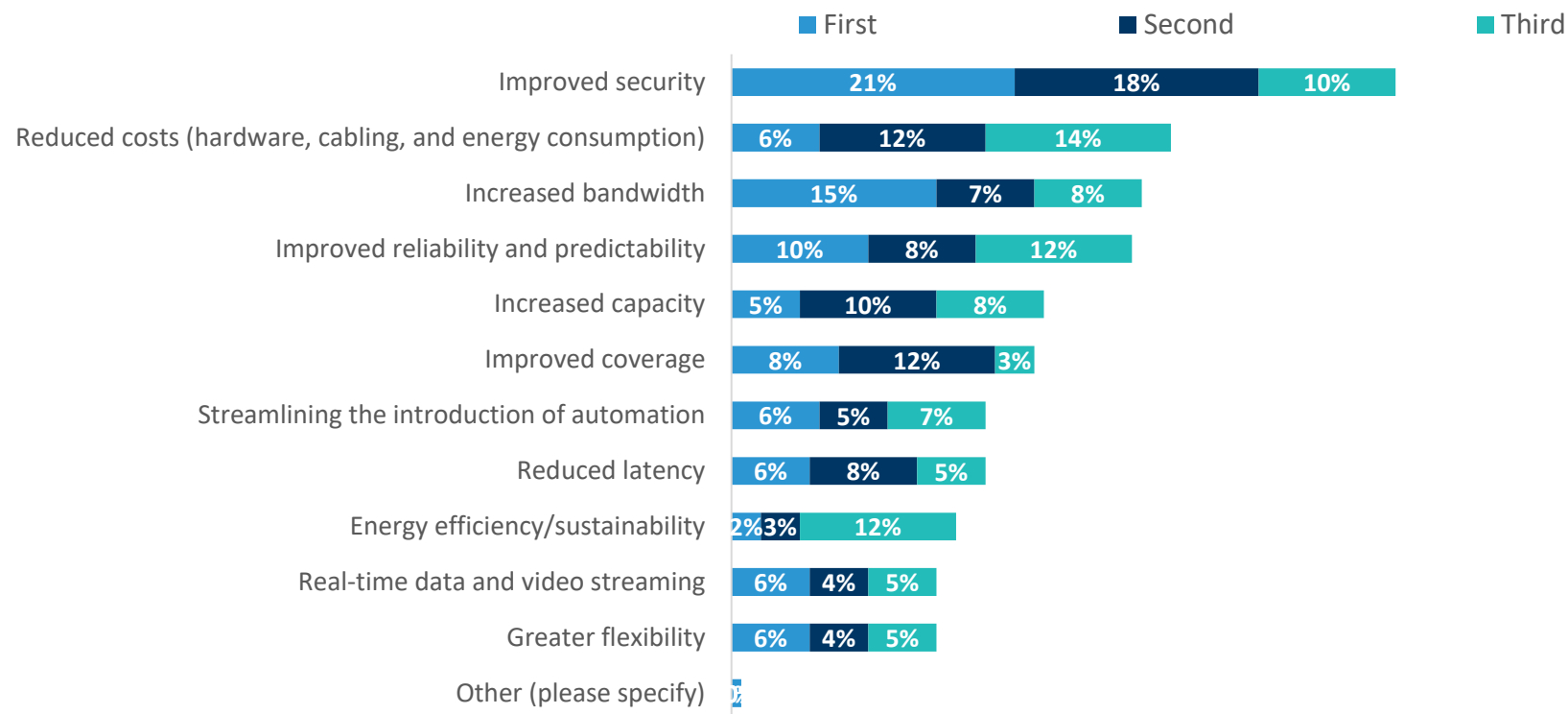


Base: All respondents (n=157).

Benefits of a Private Cellular Network

Nearly half (49%) said that improved security was a benefit of a private cellular network, while three in ten (32%) saw reduced costs as a benefit. Just 15% of respondents said real-time data and video streaming and greater flexibility were benefits.

What are the benefits of a private cellular network most valuable to your organization (Please select the top three.)

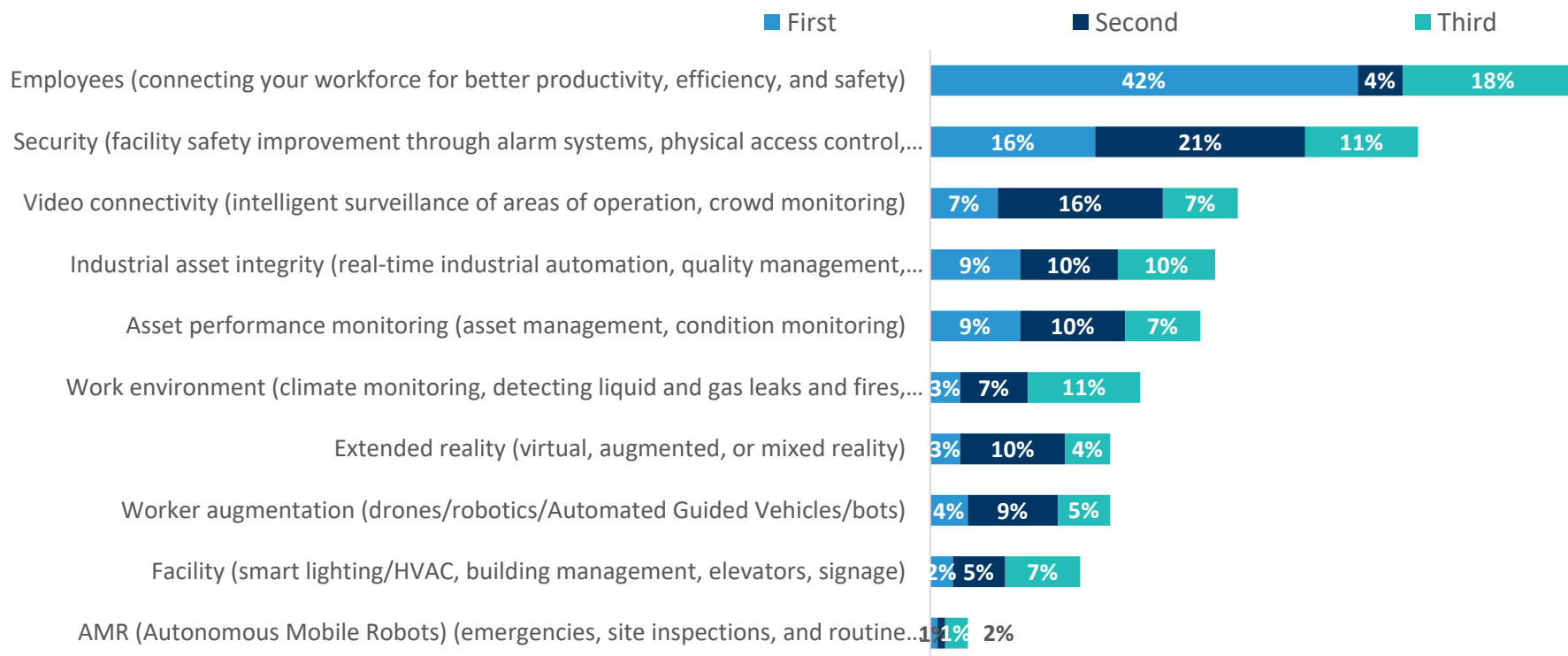


Base: All respondents (n=139).

Organizational Benefits of a Private Cellular Network

Three in five respondents (64%) said that a private cellular network would benefit the employees at their organization. Nearly half (48%) said security would be a benefit. Autonomous Mobile Robots (4%) was the least selected benefit.

How would your organization benefit most from a private cellular network? (Please select the top three.)

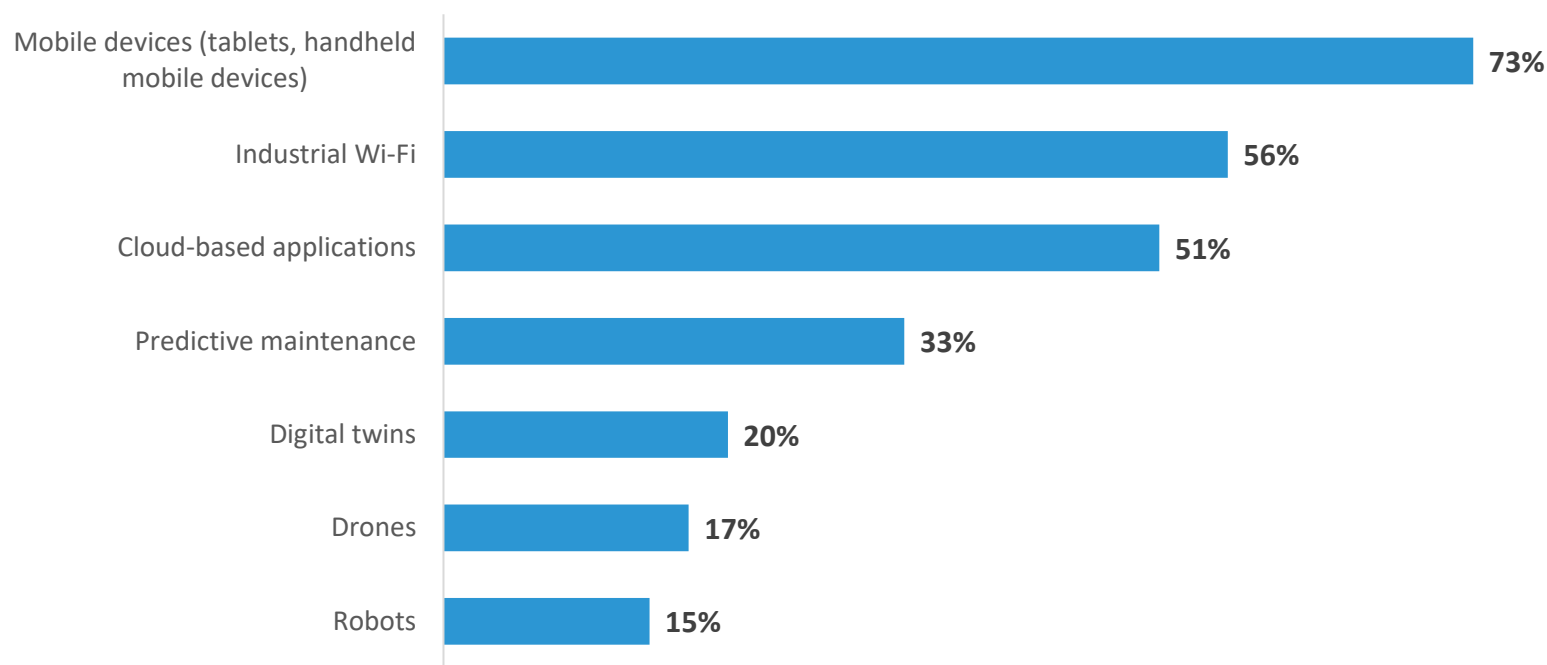


Base: All respondents (n=136).

Usage of Digital Solutions

Close to three-quarters (73%) of the respondents were using mobile devices in their networks followed by industrial Wi-Fi (56%) and cloud-based applications (51%). Robots (15%) were the least used digital solution.

What digital solutions are currently implemented in your networks? (Please select all that apply.)

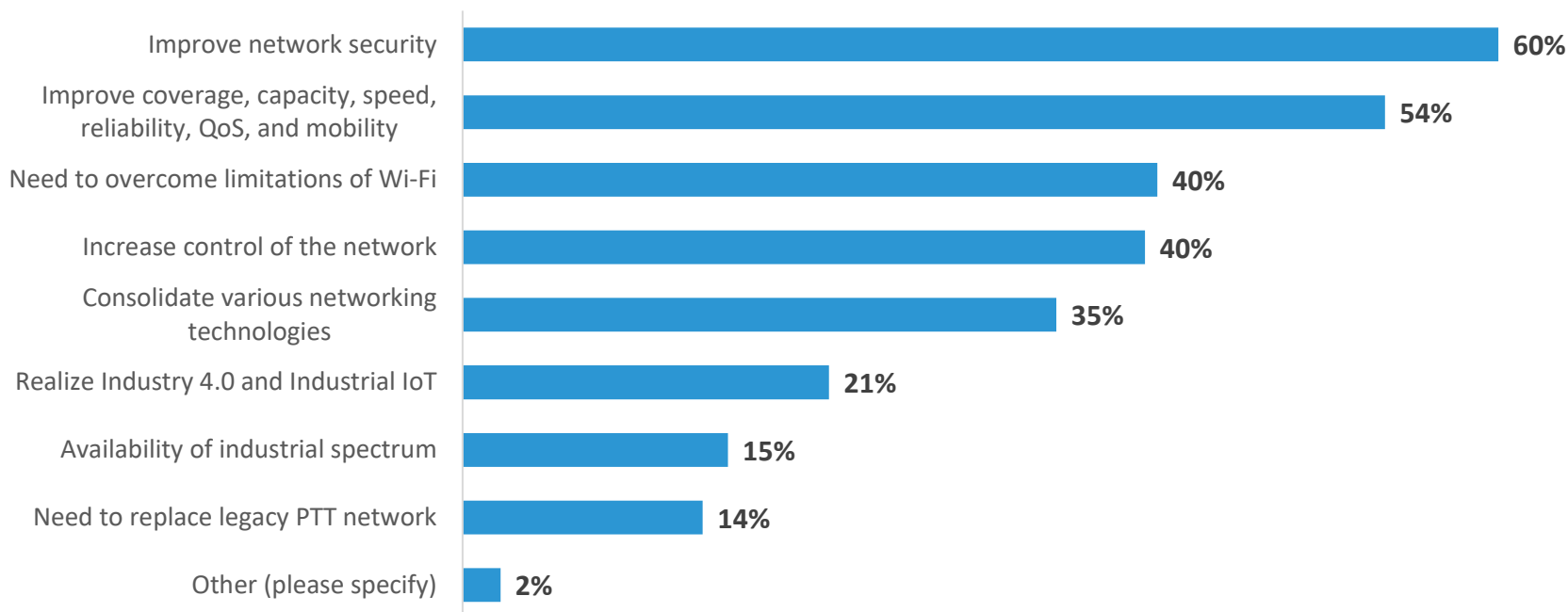


Base: All respondents (n=143).

Reasons to Integrate a Private Cellular Network

Three in five respondents (60%) said they would integrate a private cellular network to improve network security. More than half (54%) said they would want to improve coverage, capacity, speed, reliability, QoS and mobility.

For what reasons would you embark on integrating a private cellular network into your oil and gas operation? (Please select all that apply.)

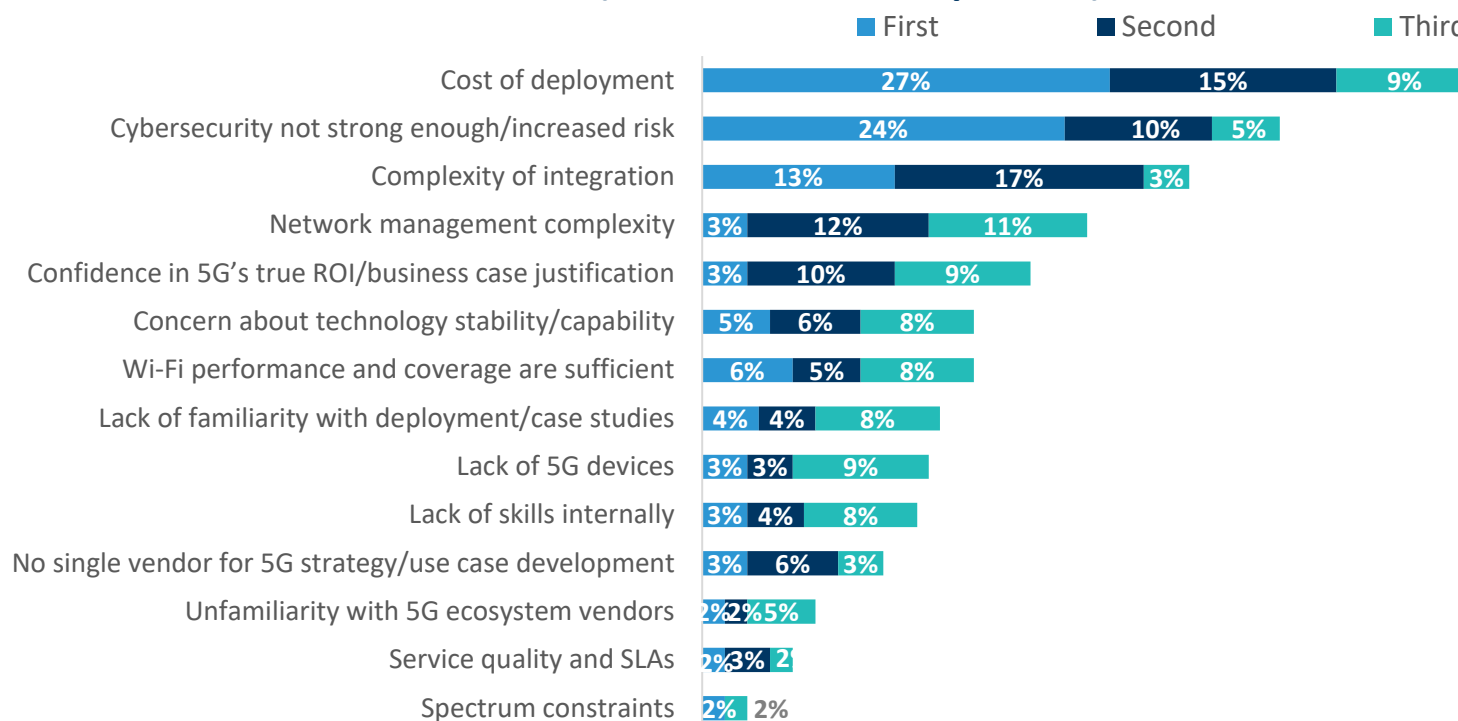


Base: All respondents (n=136).

Barriers to Private Cellular Network Adoption

More than half of respondents (51%) felt that the cost of deployment was a barrier to adopting a private cellular network followed by cybersecurity risks (39%). Spectrum constraints (4%) and service quality and SLAs (7%) were not seen as large barriers.

Of the following, what are your biggest barriers to the adoption of a private cellular network?
(Please select the top three.)

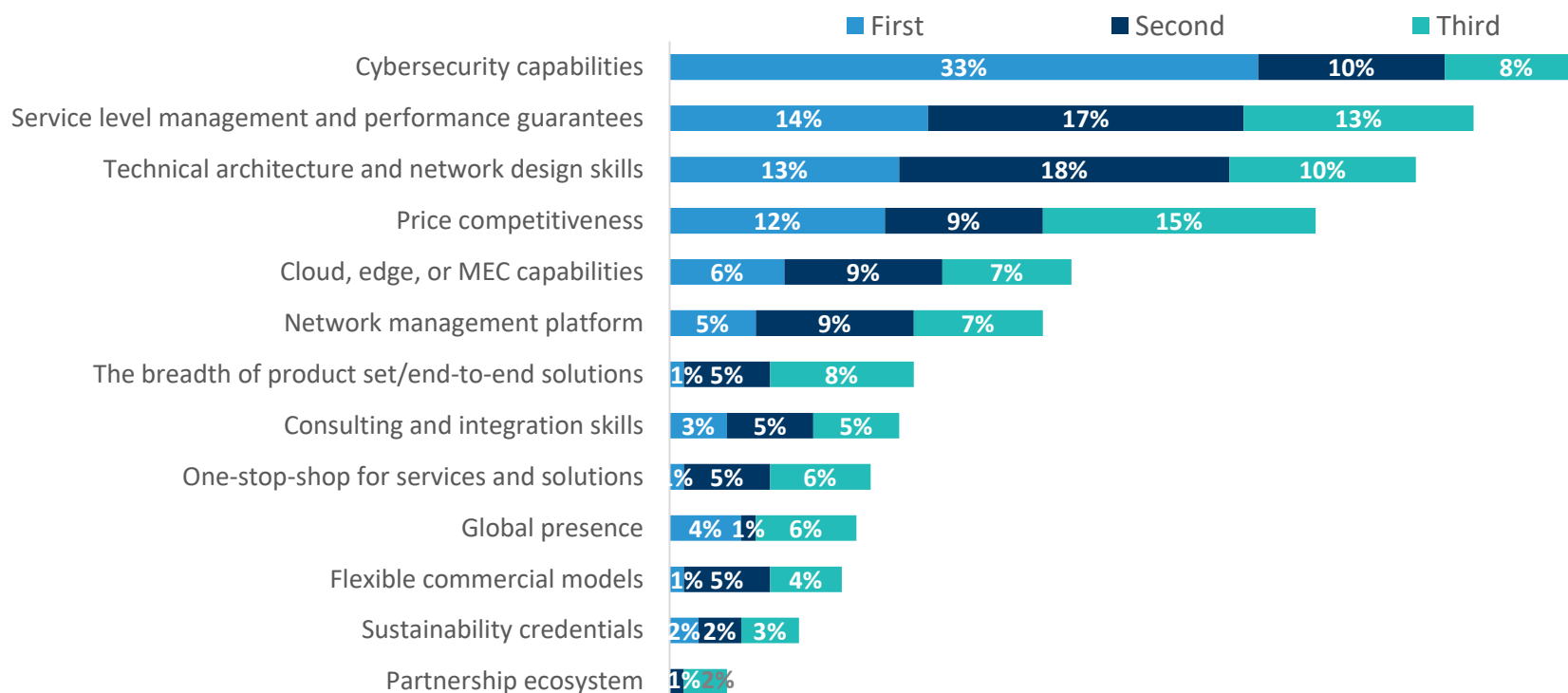


Base: All respondents (n=131).

Important Partner Attributes

More than half of respondents (51%) would want a partner with cybersecurity capabilities when planning and implementing a private 5G network followed by one that offers service level management and performance guarantees (44%) and that has technical architecture and network design skills (41%).

What are the most important attributes for a partner helping you understand, plan for, and implement a private 5G network? (Please select the top three.)

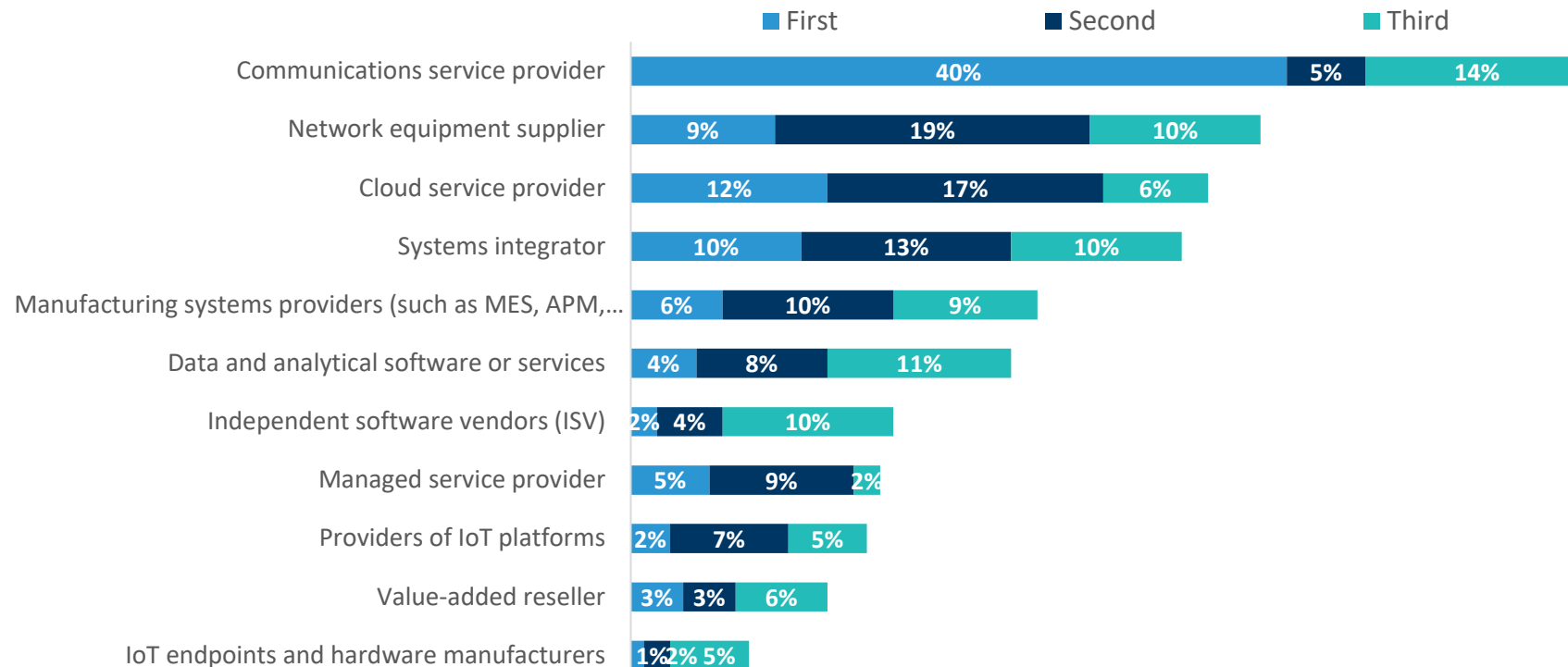


Base: All respondents (n=126).

Importance of Installation Partners

Three in five respondents (59%) felt that a communications service provider would be the most important partner to work with to install a private cellular network. The next most important partners would be a network equipment supplier (38%) and cloud service provider (35%).

Who are the most important partners to work with to install a private cellular network?
(Please select your top three.)

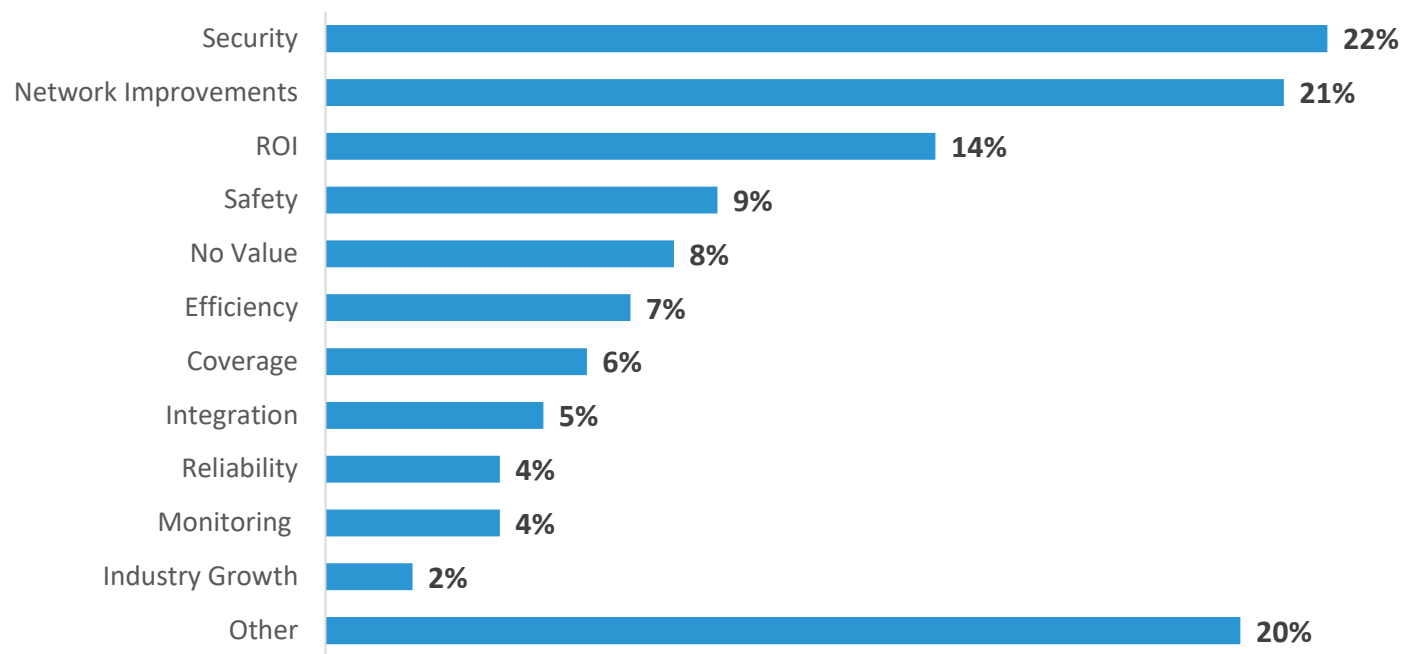


Base: All respondents (n=125).

Value of Private Cellular Network

One in five respondents mentioned security (22%) and network improvements (21%) as a benefit of employing a private cellular network. 8% of respondents did not see any value in using a private network in oil and gas.

In your opinion, what is the value of employing a private cellular network in the oil and gas sector?
(Open-ended)



Base: All respondents (n=103); open-ended.